



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/727,220	12/02/2003	John C. Schultz	59333US002	5391
32692 7590 09/12/2007 3M INNOVATIVE PROPERTIES COMPANY PO BOX 33427 ST. PAUL, MN 55133-3427			EXAMINER HUYNH, ANDY	
			ART UNIT 2818	PAPER NUMBER
			NOTIFICATION DATE 09/12/2007	DELIVERY MODE ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

LegalUSDocketing@mmm.com
LegalDocketing@mmm.com

Office Action Summary

Application No.

10/727,220

Applicant(s)

SCHULTZ ET AL.

Examiner

Andy Huynh

Art Unit

2818

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 June 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-27,29-33,35-37 and 39-43 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-27,29-33,35-37 and 39-43 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This is responsive to Amendment filed June 14, 2007. By this Amendment, claims **28, 34 and 38** have been canceled. Claims **1 and 18** have been amended. New claims **40-43** have been added. Currently, claims **1-27, 29-33, 35-37, and 39-43** are pending in the application.

Response to Arguments

Applicants' arguments filed June 14, 2007, with respect to the rejection of claims **1-27, 29-33, 35-37, and 39** have been fully considered but they are not persuasive.

In response to applicant's arguments that the Sugimoto et al. fail to a substrate comprising patterned electrically conductive layer as recited in claims **1 and 18**, and a conductive material that is patterned to form a plurality of adjacent heat spreading elements as recited in claim **26**. The examiner respectfully disagrees. The Sugimoto et al. clearly discloses in Fig. 10 a substrate comprising patterned electrically conductive layer/a radiator plate 3 made of aluminum conductor, and a conductive material/a radiator plate 3 made of aluminum conductor that is patterned to form a plurality of adjacent heat spreading elements (Sugimoto et al., col. 12, lines 39-40).

In response to applicant's arguments that Wada Kazunobu does not disclose or suggest that copper wires 48, 49 are for conducting heat. Moreover, there is no suggestion in either Wada Kazunobu or Whitehead to reconfigure the wires 48 and 49 into heat spreading elements as recited in claim **35**. The examiner respectfully disagrees. It is well known that copper is a

Art Unit: 2818

common metallic element and is on the best conductors of heat and electricity. So, the copper wires 48, 49 can be used for conducting heat, and heat spreading elements.

For the above reasons, it is believed that the rejections should be sustained.

Claim Objections

Claim 39 is objected to because of the following reasons.

It is believed that claim 39 should depend from claim 35 instead of claim 38, which has been canceled.

Claim Rejections - 35 U.S.C. § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 3-11, 16, 18-24, 26, 27, 29, 30, 33 and 40-43 are also rejected under 35 U.S.C. 102(e) as being anticipated by Sugimoto et al. (US 6,874,910 hereinafter as "Sugimoto").

Art Unit: 2818

Regarding claims **1 and 8**, Sugimoto discloses in Figs. 1, 16, 18 and the corresponding texts as set forth in column 10, line 45-column 12, line 34, column 22, line 60-column 25, line 6, an illumination assembly/a light source apparatus 1 comprises:

a substrate comprising an electrically insulative layer/an insulating member 4 on a first side of the substrate and an electrically conductive layer/a radiator plate 3 made of thermally conductive material on a second side of the substrate;

a plurality of LED dies/chips 2, each LED die/ chip disposed in a via/a through hole 6 extending through the electrically insulative layer/the insulating member on the first side of the substrate to the electrically conductive layer/the radiator plate on the second side of the substrate, wherein each LED die/chip is electrically and thermally connected through the via/the through hole to the electrically conductive layer/the radiator plate on the second side of the substrate (Figs. 16 and 18, col. 23, lines 37-50, col. 24, lines 55-67).

Regarding claim **3**, Sugimoto discloses the electrically insulative layer/the insulating member made of polymer on the first side of the substrate.

Regarding claim **4-6**, Sugimoto discloses all the claimed limitations except for the via extending through the electrically insulative material is chemically etched, plasma etched, or laser milled. However, the limitations “the via extending through the electrically insulative material is chemically etched, plasma etched, or laser milled” is taken to be a product by process limitation and consider non-limitation. In a product-by-process claim, it is the patentability of the claimed product and not of the recited process steps which must be established. Therefore, when the prior art discloses a product which reasonably appears to be identical with or only slightly different than the product claimed in a product-by process claim, a rejection based on sections

Art Unit: 2818

102 or 103 is fair. The Patent Office is not equipped to manufacture products by a myriad of processes put before it and then obtain prior art product and make physical comparisons therewith. In re Brown, 173 USPQ 685 (CCPA 1972). Also, a product by process claim directed to the product per se, no matter how actually made, In re Hirao, 190 USPQ I S at 17 (footnote 3). See In re Fessman, 180 USPQ 324, 326 (CCPA 1974); In re Marosi et al., 218 USPQ 289, 292 (Fed. Cir. 1983); and particularly In re Thorpe, 227 USPQ 964, 966 (Fed. Cir. 1985), all of which make it clear that it is the patentability of the final structure of the product "gleaned" from the process steps, which must be determined in a "product by process" claim, and not the patentability of the process. See also MPEP 2113. Moreover, an old and obvious product produced by a new method is not a patentable product, whether claimed in "product by process" claims or not.

Regarding claim 7, Sugimoto discloses the electrically conductive layer/the radiator plate on the second side of the substrate comprises a material selected from the group comprising copper, nickel, gold, aluminum, tin, lead, or a combination thereof (col. 10, line 55).

Regarding claims **9, 19, 27, 40 and 42**, Sugimoto discloses in Fig. 10 the electrically conductive layer/the radiator plate is patterned to define a plurality of electrically isolated heat spreading elements 3a, 3b, each LED die electrically and thermally coupled to an associated heat spreading element, wherein the patterned electrically conductive layer comprises an array of spaced apart heat spreading elements.

Regarding claims **10-11, 16 and 33**, Sugimoto discloses the illumination assembly further comprises a heat dissipation assembly disposed adjacent the second side of the substrate

Art Unit: 2818

wherein the heat dissipation assembly is separated from the second side of the substrate by a layer of material that is thermally conductive (Fig. 18, col. 24, line 64-col. 25, line 4).

Regarding claims **18 and 20-22**, Sugimoto discloses in Figs. 1, 16 and 18 and the corresponding texts as set forth in column 10, line 45-column 12, line 34, column 22, line 60-column 25, line 6, an illumination apparatus/a light source apparatus 1 comprises:

a substrate having an electrically insulative layer/an electrically insulating member 4 on a first surface and an electrically conductive layer/a radiator plate 3 made of thermally conductive material on a second surface, a plurality of mounting vias/through holes 6 extending through the electrically insulating layer to the electrically conductive layer/the radiator plate;

a plurality of light emitting elements/LED chips 2 disposed in the plurality of mounting vias/through holes, wherein the light emitting elements are electrically and thermally connected to the electrically conductive layer through the mounting vias/through holes (Figs. 16 and 18, col. 23, lines 37-50, col. 24, lines 55-67).

Regarding Claims **23, 29 and 30**, Sugimoto discloses in Fig. 16 the illumination apparatus of further comprising a plurality of wirebond vias 4e extending through the electrically insulating layer 4 to the electrically conductive layer, each wirebond via exposing a corresponding wirebond connection pad of the electrically conductive layer.

Regarding claim **24**, Sugimoto discloses in Fig. 1 the illumination apparatus/the light source apparatus further comprises a thermally conductive encapsulant/a sealing rein 10 contacting the light emitting elements and electrically insulating layer.

Art Unit: 2818

Regarding claim **26**, Sugimoto discloses in Figs. 1, 10, 16, 18 and the corresponding texts as set forth in column 10, line 45-column 12, line 34, column 22, line 60-column 25, line 6, an illumination assembly/a light source apparatus 1 comprises:

a layer of an electrically insulative layer/an insulating member 4;

a layer of thermally and electrically conductive material/a radiator plate 3 disposed on a bottom surface of the layer of insulative material, the conductive material/the radiator plate patterned to form a plurality of adjacent heat spreading elements 3a, 3b (Fig. 10);

a plurality of vias/through holes 5', 6 in the insulative layer/the insulating member, each via extending through the insulative material to an associated heat spreading element;

a plurality of light emitting elements/LED chips 2, each light emitting element/LED chip disposed in one of vias/through holes, each light emitting element/LED chip is electrically and thermally connected to the heat spreading element associated with via/the through hole (Figs. 10, 16 and 18, col. 23, lines 37-50, col. 24, lines 55-67).

Regarding claims **41 and 43**, Sugimoto discloses in Fig. 23(f) each LED die is electrically connected to at least two adjacent/adjacent spaced apart heat spreading elements.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims **2, 25, 31 and 32** are rejected under 35 U.S.C. 103(a) as being unpatentable over Sugimoto et al. (USP 6,874,910 hereinafter as "Sugimoto") in view of Matsui et al. (US Pub. No. 2003/0052594 A1 dated 03/20/2003 filed 09/17/2002 hereinafter as "Matsui").

Sugimoto discloses all the claimed limitations as above except for the substrate is flexible. Matsui teaches that a flexible substrate is used in a lighting apparatus for the flexibility. It would have been obvious to one having ordinary skill in the art at the time of the invention was made to use a flexible substrate in a lighting apparatus for the flexibility as taught by Matsui.

Claims **12-15 and 17** are rejected under 35 U.S.C. 103(a) as being unpatentable over Sugimoto et al. (USP 6,874,910 hereinafter as "Sugimoto").

Sugimoto discloses the claimed limitations except for the thermally conductive, material is an adhesive; wherein the thermally conductive, adhesive material is a polymer adhesive loaded with boron nitride; wherein the thermally conductive, material is non-adhesive; wherein the thermally conductive, non-adhesive material is a polymer loaded with silver particles; and wherein the thermally conductive member comprises a material selected from the group comprising metals and polymers. It would have been obvious to one having ordinary skill in the art at the time of the invention was made to select either one of the thermally conductive materials as above, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. In re Leshin, 125 USPQ 416.

Art Unit: 2818

Claims **35-37 and 39** are rejected under 35 U.S.C. 103(a) as being unpatentable over Wada Kazunobu (FR 2662896 dated 12/06/1991) in view of Whitehead (USP 5,661,839).

Regarding Claims **35-37**, Wada Kazunobu discloses in Fig. 5 and the corresponding texts as set forth on page 6, line 23-page 7, line 26, a flexible circuit comprising:

a flexible layer of electrically insulative material 41;

a flexible layer of electrically conductive material 33, 48, 49 disposed on a first surface of the insulative material, the conductive material patterned to form a plurality of adjacent heat spreading elements, each heat spreading element having a first electrical connection pad and a second electrical connection pad;

a plurality of mounting vias extending through the insulative material wherein each mounting via exposes the first electrical connection pad of an associate heat spreading element.

Wada Kazunobu discloses the claimed limitations except for the insulating material comprising an at least partially reflective multilayer optical film, wherein the multilayer optical film is shaped into a non-planar structure. Whitehead teaches that a highly reflective multilayer optical film is used to obtain efficient, uniform emission of diffuse light as set forth in col. 1, lines 6-7. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to form the insulating material comprising an at least partially reflective multilayer optical film in order to obtain efficient, uniform emission of diffuse light. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to form the multilayer optical film being shaped into a non-planar structure, since such a

Art Unit: 2818

modification would have involved a mere change in the shape of the multilayer optical film. A change in shape is generally recognized as being within the level of ordinary skill in the art.

Conclusion

Applicants' amendment necessitated the new ground(s) of rejection presented in this Office Action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicants are reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andy Huynh whose telephone number is (571) 272-1781. The examiner can normally be reached on Monday-Friday 6:30am-3:00pm. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven Loke can be reached on (571) 272-1657. The fax phone numbers for the organization where this application or

Art Unit: 2818

proceeding is assigned are (571) 273-8300 for regular communications and (703) 872-9306 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Ah

A handwritten signature in black ink, appearing to read "Andy Huynh", with a stylized flourish at the end.

Andy Huynh
Primary Examiner